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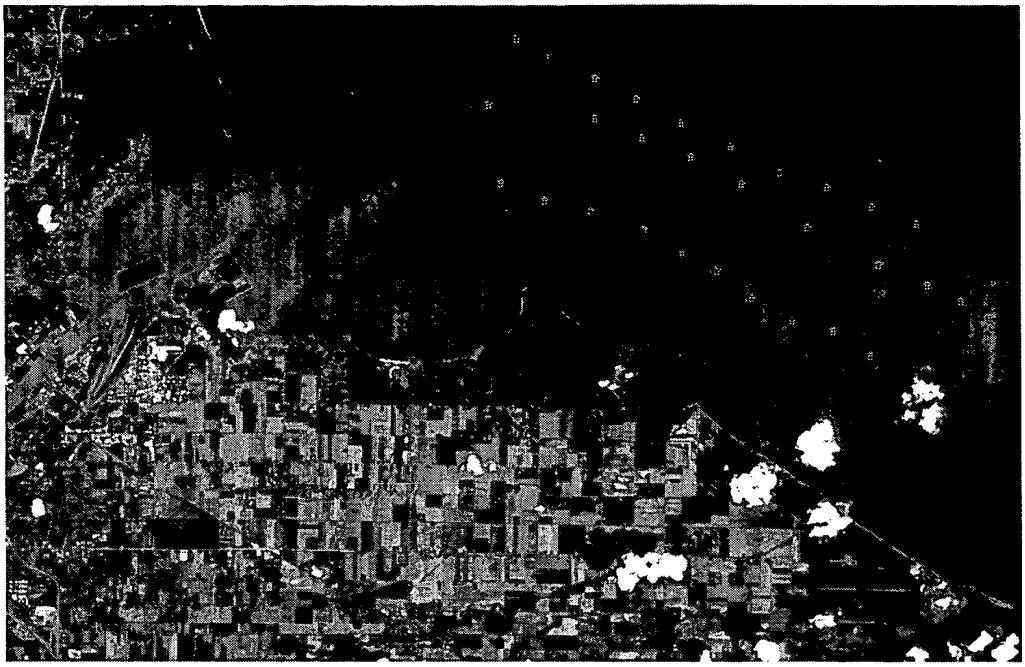

Figure 1. LANDSAT 7 ETM+ image (bands 1, 2, and 3 displayed as blue, green, and red, respectively) of part of the July 1, 2000, Path 20 Row 31 frame, showing collection sites of 30 water samples as black dots in Maumee Bay, Ohio. North is to toward the top.

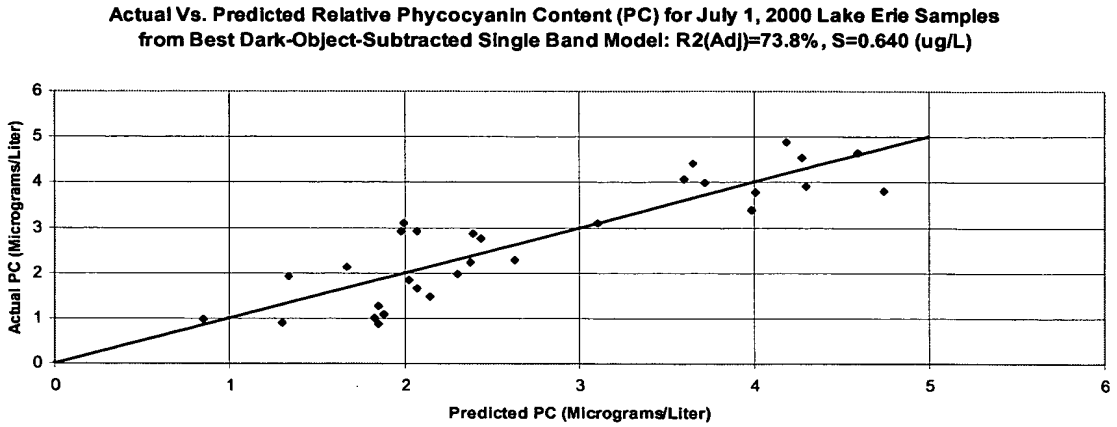

Figure 2. Each diamond represents the actual and predicted value of relative phycocyanin concentration (PC), according to the best model derived from dark-object-subtracted single bands of LANDSAT TM imagery for Lake Erie water samples collected on the same date as the LANDSAT 7 overpass (July 1, 2000). The solid line represents perfect agreement between actual and predicted PC values.

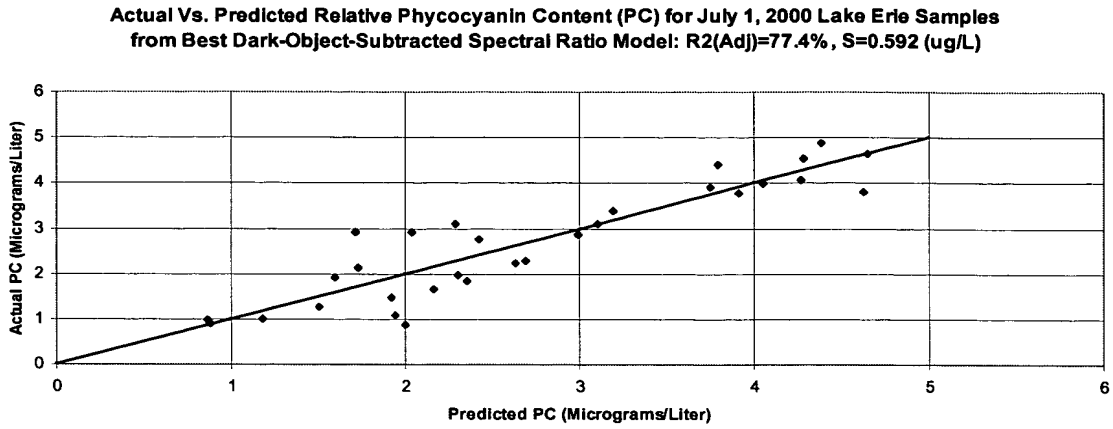

Figure 3. Each diamond represents the actual and predicted value of relative phycocyanin concentration (PC), according to the best model derived from dark-object-subtracted spectral ratios of LANDSAT TM data for Lake Erie water samples collected on the same date as the LANDSAT 7 overpass (July 1, 2000). The solid line represents perfect agreement between actual and predicted PC values.

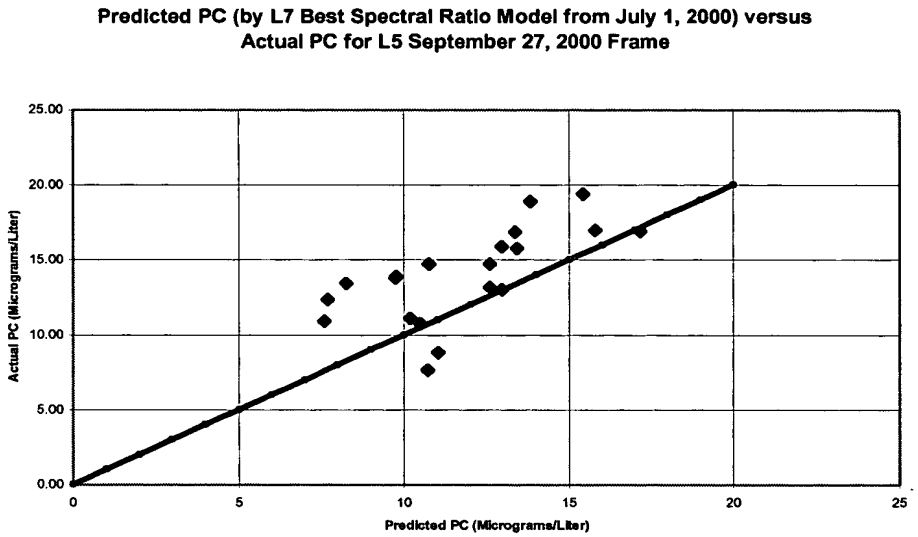

Figure 4. Application of the best LANDSAT 7, July 1, 2000 spectral ratio model for relative phycocyanin concentration (PC) to the LANDSAT 5 dataset (September 27, 2000). Each diamond represents the actual (from the water samples collected on September 27, 2000) and predicted values of relative phycocyanin concentration (PC).

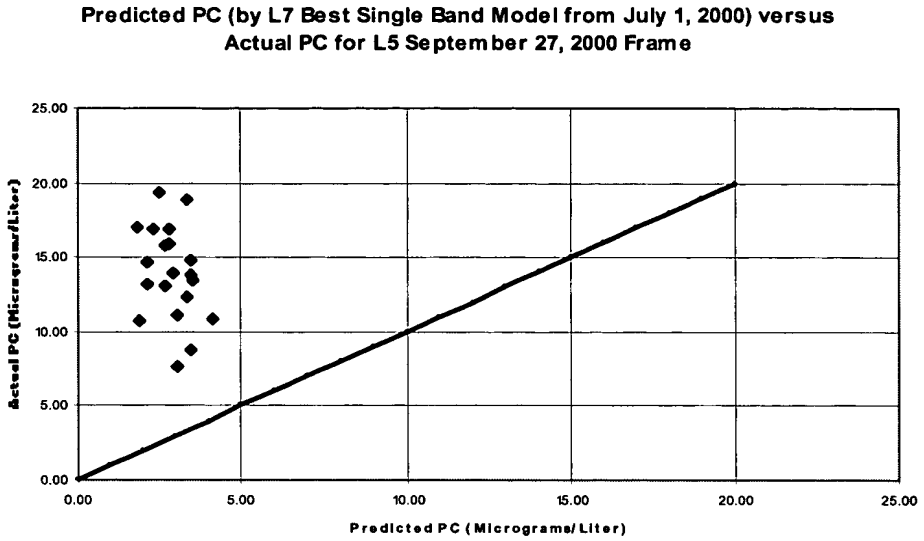

Figure 5. Application of the best LANDSAT 7, July 1, 2000 single band model for relative phycocyanin concentration (PC) to the LANDSAT 5 dataset (September 27, 2000). Each diamond represents the actual (from the water samples collected on September 27, 2000) and predicted values of relative phycocyanin concentration (PC).

Figure 6. Relative phycocyanin content (PC) displayed as red (8.06-9.25 µg/l) to blue (0-5.17 µg/l), from the July 1, 2000 best spectral ratio model, applied to the July 1, 2000, LANDSAT 7 frame. North is toward the top; the whole frame (shown within the black border) covers 185km x185 km on the ground.

Figure 7. Phycocyanin content (PC) displayed as red (10.31-15.77 µg/l) to blue (0-2.50 µg/l), from the July 1, 2000 best spectral ratio model, applied to the September 27, 2000, LANDSAT 5 frame. North is toward the top.

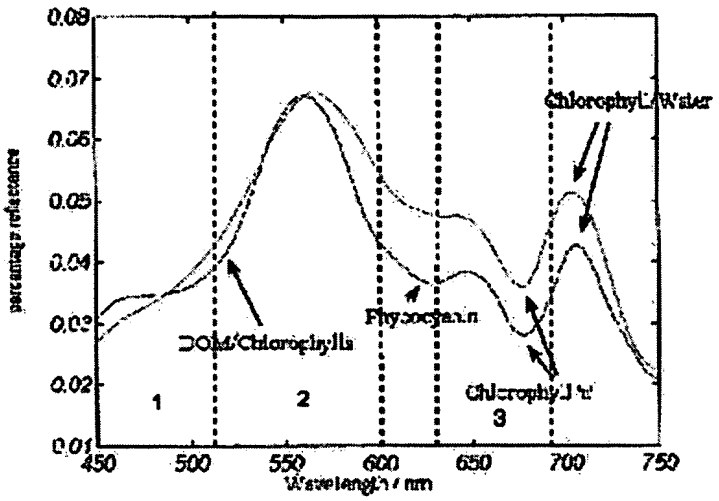

Figure 8. Percent reflectance (%) versus wavelength (nanometers) of absorption features of lake water containing primarily chlorophyll *a* (top curve) and water from another lake containing both phycocyanin and chlorophyll *a* (after Green, 2003). Wavelength limits of LANDSAT TM bands 1 (450-520 nm), 2 (520-600 nm), and 3 (630-690 nm) are shown as vertical bars, but limits for TM bands 4 (760-900 nm), 5 (1,550-1,750 nm), and 7 (2,080-2,350 nm) are not shown. Spectral locations of absorption bands for chlorophyll *a*, phycocyanin, and dissolved organic matter (DOM)/chlorophylls are identified.

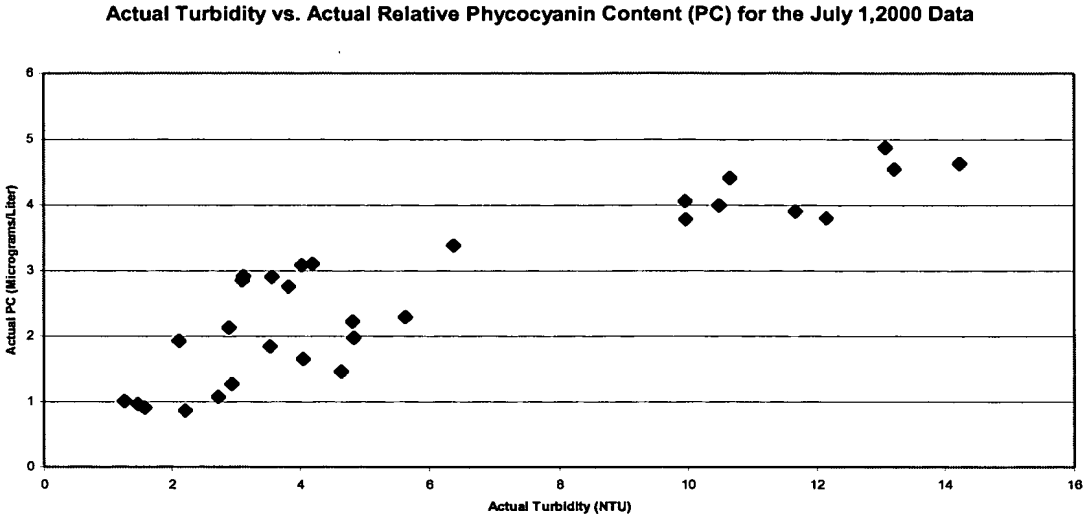

Figure 9. Actual turbidity plotted versus actual PC for the July 1, 2000 water samples.

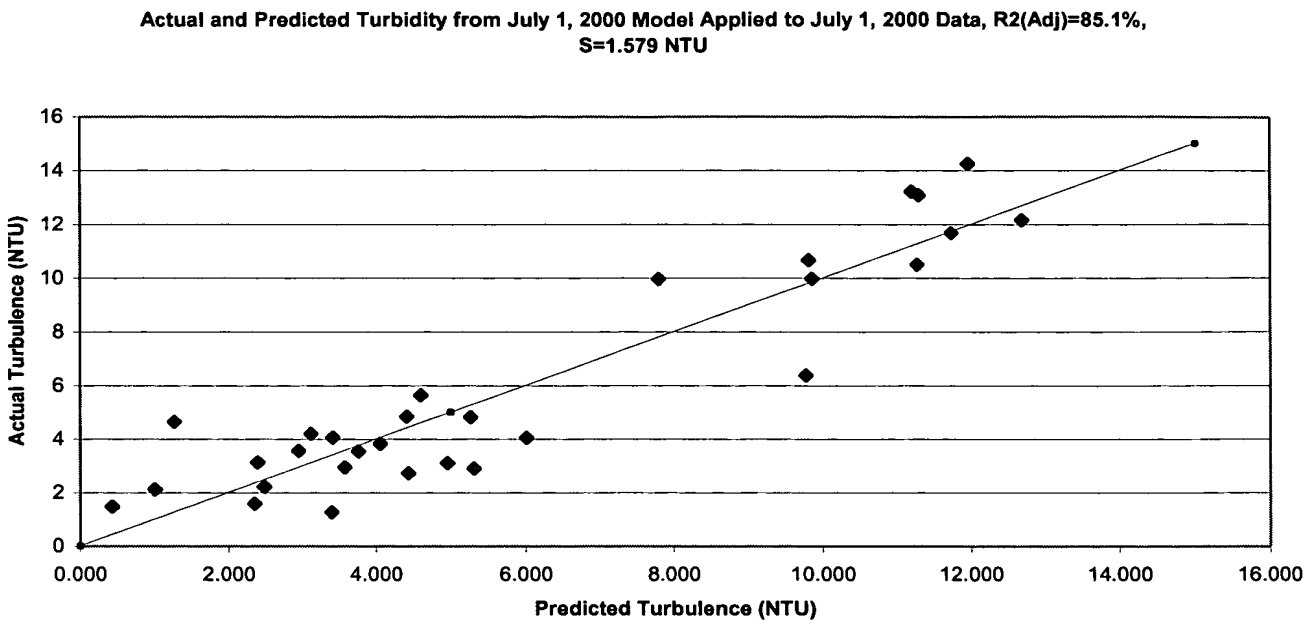

Figure 10. Actual vs. predicted turbidity from the July 1, 2000 turbidity model, applied to the July 1, 2000 LANDSAT 7 frame for P20R31.

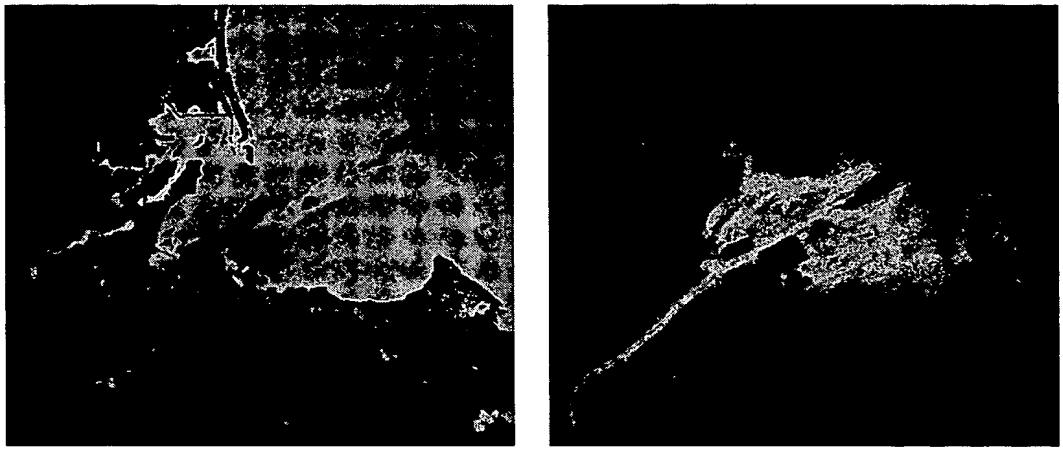

Figure 11. Turbidity (left) and PC (right) images of the Maumee River Mouth subregion (SW corner of Lake Erie) of the July 1, 2000 LANDSAT 7 ETM+ frame. In both cases, red corresponds to the highest contents of the parameter being imaged. North is toward the top.

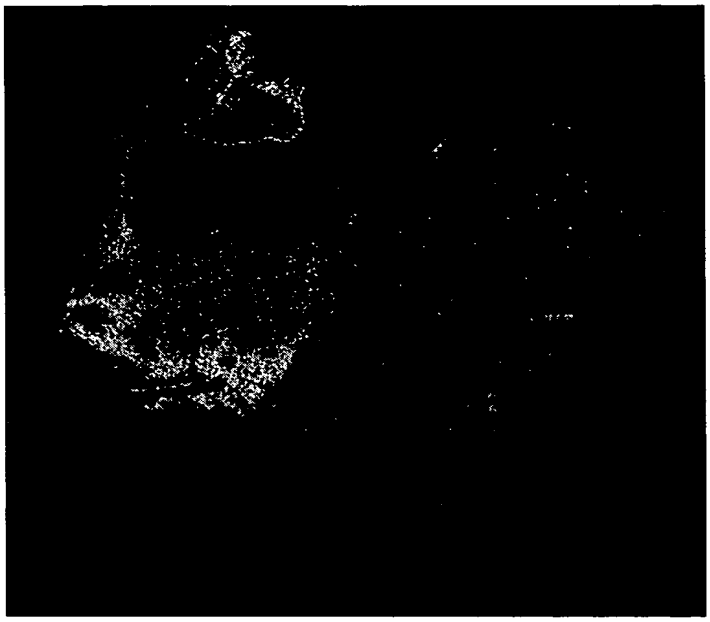

Figure 12. Phycocyanin content of P19R31 of Western Lake Erie (red is highest PC, from 4.98-12.00 µg/L) for LANDSAT 7 ETM data of July 16, 2002, according to the July 1, 2000 model. North is toward the top.

Figure 13. Phycocyanin content of P19R31 of Western Lake Erie (red is highest PC, from 4.98-12.00 µg/L, and dark blue is zero) for LANDSAT 7 ETM data of August 1, 2002, according to the July 1, 2000 model. North is toward the top.

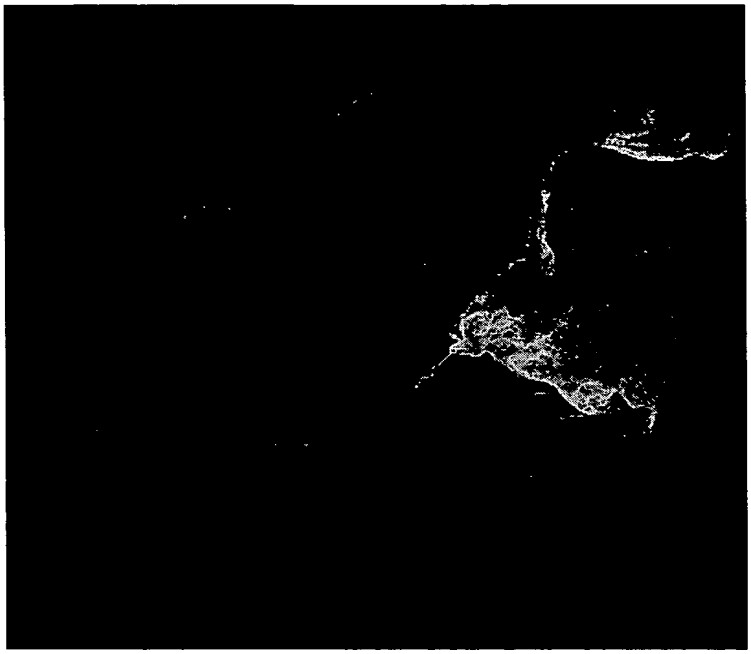

Figure 14. Phycocyanin content of P20R31 of westernmost Lake Erie (red is highest PC, from 11.57-12.51 µg/L, and dark blue is lowest PC, 0.00-5.62 µg/L) for LANDSAT 7 ETM data of August 8, 2002, according to the July 1, 2000 model.